Pinal Creek Group Welcomes Public Participation

Although state and federal regulators often visit the Pinal Creek remediation project, for many years the Pinal Creek Group also has hosted numerous interested parties and VIPs at the Pinal Creek site. Visitors receive technical presentations and facility tours and often visit locations at Pinal Creek where they can personally observe the project's success.

Many scientists and academic groups have visited the site over the years, including groups from the University of Arizona, Arizona State University, Northern Arizona University, New Mexico Technical University, various other universities and community colleges, the U.S. Geological Survey, the Society of Mining Engineers, and the Arizona Foundation for Resource Education.

Occasionally, the tours and briefings have an international flavor. For example, an academic group that recently visited the Pinal Creek project included students from Brazil, Spain, and Chile. Other groups have included visitors from South Africa, Australia, and Peru. The Pinal Creek Group also works actively with state and local government officials, school districts, scouting organizations, church groups, community service organizations, and individuals who have an interest in the Pinal Creek project.

Pinal Creek Group has hosted several distinguished visitors, including Rick Renzi, Congressman for Arizona's 1st District, and staff members of the Arizona Congressional Delegation. Congressman Renzi commented that he was impressed with the progress being made by private sector entities acting cooperatively with state and federal regulators. The Environmental Protection Agency's Superfund Committee of the National Advisory Council for Environmental Policy also visited the Pinal Creek project and gained an understanding of how well the Arizona's superfund program (WQARF) works under the administration of the Arizona Department of Environmental Quality.

According to Jay Spehar, the Pinal Creek Group's Technical Committee Chairman and public spokesman, "Over the past several years, the Pinal Creek Group has engaged in over two hundred public outreach and participation activities. We welcome these opportunities to receive public input and to share our experiences with interested parties. It's a very constructive process and a great learning experience for all parties concerned. Mr. Spehar can be reached at 928-473-7161.

Public Invited to Attend Open House

Pinal Creek Group and the Arizona Department of Environmental Quality cordially invite you to attend an open house on March 31, 2005, from 3:00 PM to 7:00 PM, at the Tri-Cities Fire Hall. The open house will focus on cleanup activities at the Pinal Creek WQARF Site.

The Pinal Creek Group
P.O. Box 4444
Claypool, Arizona 85532

Medical Monitoring Program Completed

Beginning in March 2001, The Health Effects Group, Inc., under the direction of Dr. John B. Sullivan, Jr., M.D., University of Arizona Health Sciences Center, and a team of 10 consulting physicians, conducted an extensive assessment, or monitoring, of individuals in the areas of Globe, Claypool, Miami, and Wheatfields. The purpose of this medical monitoring was to determine whether any of these individuals may have suffered adverse health effects due to potential manganese exposure from drinking groundwater. The assessment was conducted with complete independence from the Pinal Creek Group. Qualified participants were self-selected and testing was conducted as a part of the Wilkes Settlement Agreement, which is on file at the Miami Public Library.

This monitoring program tested 343 individuals and was implemented in three stages, or tiers, conducted at The Holiday Hills Mobile Home Park (Tier I), the Cobre Valley Hospital (Tier II) and the University Medical Center in Tucson (Tier III). At each tier of the monitoring, the physicians conducted more specific testing. Tier I testing enrolled 343 individuals, 73 individuals were invited to continue to Tier II testing, and 25 individuals were invited to continue to Tier III testing.

After completing Tier III testing, The Health Effects Group concluded: "No subject who completed all three tiers had neuroimaging evidence of adverse manganese effects on the basal ganglia of their brains." The medical monitoring program was concluded in October 2001, and the Health Effects Group issued a final report entitled *Environmental Manganese Exposure, Medical Examination of a Class of Subjects,* dated July 15, 2002. The report states: "At the conclusion of the medical screening program, no subject tested had evidence of neurological adverse effects that could be attributed to manganese." A copy of the report is available at the Miami Memorial Library. The medical monitoring program is now concluded.

This report has been prepared by the Pinal Creek Group, an alliance of mining companies conducting groundwater cleanup activities in the narrow, shallow aquifer underlying the dry Pinal Creek streambed. For more information about the articles in this report, or about the Pinal Creek Group's activites, please contact Jay Spehar at 928-473-7161.

COMMUNITY REPORT

A periodic newsletter about environmental cleanup activities in the Pinal Creek Aquifer • March 2005

Pinal Creek Habitats Continue to Improve

A flourishing riparian habitat is a sure sign that the restoration efforts of the Pinal Creek Group are paying off despite the severe drought. Release of treated groundwater and special management activities have stimulated plant growth and allowed riparian and aquatic habitats to improve significantly at the six sites that biologists have routinely monitored since 1999 as part of the Pinal Creek Group's ongoing remediation project. The increase for native, woody, riparian habitat, such as willow, cottonwood, and sycamore at the six individual monitoring sites is up significantly and ranges from a low of 40% to a high of 350%. Since the 1999 baseline year, the cumulative increase for riparian habitat at all six monitoring sites is over 900%.

Exotic-species control also has been very successful, with an 87% reduction of saltcedar (tamarisk) and tree of heaven since control efforts and monitoring began. This labor-intensive process involves treating invasive, non-native species and/or cutting them down to make room for the natural establishment of native cottonwoods, willows, and sycamores. Density of exotic species is well below the targeted 10% of the total basal area established in 1999.

Another factor contributing to the increased density of native plant species is a livestock management plan that controls grazing in several pastures along perennial Pinal Creek. The construction of fences has made it possible for riparian habitats to recover while still providing enough pasture to meet landowners' grazing needs. Fenced areas are either closed entirely to grazing or are closed to grazing each year from April through October. In certain areas winter grazing may be allowed. As a result, willows and cottonwoods are becoming well established along several portions of perennial Pinal Creek, with both species exhibiting significant increases in the five years since the riparian management program was implemented.

Water quality also has continued to improve significantly. Metals now pose only a negligible potential risk to aquatic life. The Pinal Creek Group's remediation facilities and the release of treated groundwater to perennial Pinal Creek has markedly reduced concentrations of metals at all monitoring sites, and surface water quality meets all remedial action objectives. Aquatic life is also benefiting from the formation of more pools and a better balance between pool and riffle habitat. In 2002 the State of Arizona listed surface water in Bloody Tanks Wash as "impaired" due to elevated copper and listed perennial Pinal Creek as impaired due to elevated manganese and low pH. Due to surface water quality improvements, the State of Arizona rescinded the "impaired" status in 2004.

One method for gauging the health of aquatic habitats is the State of Arizona's Warm Water Index. In fall 2003 the scores at one monitoring site were the highest ever recorded, despite the scouring and loss of riparian cover resulting from a major storm event. In spring 2004, the scores for all of the Pinal Creek monitoring sites were the same or better than those in spring 2003. At two sites they were the highest, or matched the highest, scores ever observed at those locations. Eventually, Warm Water Index scores are expected to reach a plateau as a balanced macroinvertebrate community develops.

The Pinal Creek Group's riparian and aquatic habitat project, now in its fifth year, is a proven success and provides a tested methodology and convincing data for others interested in restoring riparian areas throughout the arid southwest. The Pinal Creek Group plans to continue its management and monitoring programs in perennial Pinal Creek and to periodically report the results to interested parties.

What's Inside:

Dealing With Drought

On March 20, 2003, Governor Janet Napolitano issued Executive Order 2003-12 creating a Drought Task Force to identify and plan responses to potential problems resulting from the current drought. Among the issues being evaluated are: potentially low supplies of potable water for water providers, drought-related water level declines that can cause a loss of supply for individual domestic wells, insufficient water supply for crops and livestock, and impacts to wildlife and wildlife habitat due to reduced availability of water.

All of these issues are of interest to the residents of the Globe-Miami area, including the Pinal Creek Group, as we work to manage our water resources wisely.

The Drought

Drought is a sustained, natural reduction in precipitation that negatively affects the environment and human activities. Short-term droughts are limited to periods of several months and, while inconvenient, they are transient. Long-term droughts, on the other hand, can last for years and may significantly affect the availability of both surface and subsurface water supplies.

Arizona has been subject to several major statewide droughts occurring from the late 1890s through the early 1900s, the late 1940s through the mid-1960s, and the current cycle that began in the late 1990s. Droughts such as these result from below-normal rainfall and snowfall, and consequently, less runoff to surface water streams and less recharge to groundwater aquifers. The effect of these droughts on surface water in Arizona is illustrated by the change in annual average streamflow of the Salt River, as shown by Figure 1.

When drought occurs, water levels in groundwater aquifers can drop significantly. The graph in Figure 2 illustrates the water level in the Gila Conglomerate near Wheatfields. The increase in water levels during the rainy period of the early 1990s is clearly shown, as is the continued decline of low water levels through the current drought period. It could take several years to replenish the groundwater supply depending on the rates at which water is depleted from and recharged to the aquifer.

During a sustained drought, a substantial drop in groundwater levels due to reduced aquifer recharge can place small capacity domestic wells at risk of lowered production or going dry. During times of lower than normal water levels, overlapping pressure from other, nearby pumping wells can cause further water level decline. Where water supplies are dependent on groundwater pumping, water conservation and good well maintenance practices are essential to minimize the effects of drought.

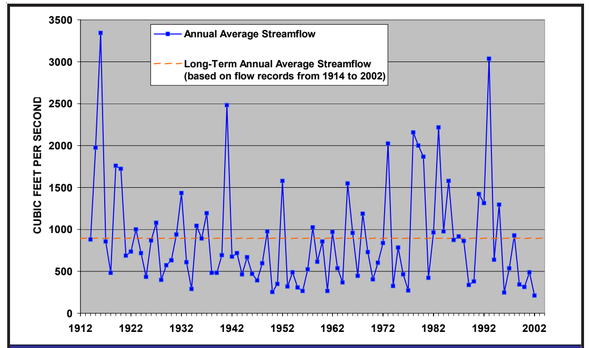

Figure 1. The blue line shows annual average streamflow at the U.S. Geological Survey (USGS) Salt River gaging station near Roosevelt Lake. Note that streamflow was frequently less than the long-term average during the drought between 1942 and approximately 1964. By comparison, streamflow was higher than the long-term average during the wet period of the 1980s and early 1990s. The lowest streamflow of the record is also the most recent data point, occurring in 2002.

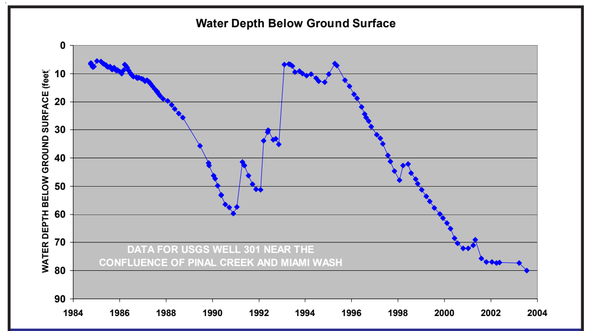

Figure 2. This graph shows the depth to groundwater in Gila Conglomerate in a USGS well near Wheatfields. A water level increase of more than 35 feet occurred over five months between December 1992 and April 1993. Extrapolating the declining trend since the last data point in 2002 suggests the current depth to water is probably about 90 feet.

Water Conservation

Water conservation eliminates the loss of water to waste and reduces the overall demand for water. Water conservation isn't always easy and may not be the final answer to drought-related water supply needs, but it can lessen the potential impact of drought. Examples of actions that can be taken to save water include:

- Conduct a water audit of your home and property to replace wasteful, high-volume fixtures with low-flow fixtures and repair any leaks;
- Reduce landscape irrigation by replacing "thirsty" vegetation with drought-tolerant species and using drip irrigation systems;
- Reduce discretionary outdoor water use such as car washing and, if you have a pool, use a pool cover to reduce evaporation;
- Harvest rainwater by collecting, storing, and redirecting stormwater runoff; and
- Reduce water needed for essential household activities by limiting showers to five minutes or less and waiting to do laundry or dishes until there is a full load.

It may not be possible in a time of drought to meet all your water needs through water conservation alone, and you may be required to supplement your supply through a water delivery service or by obtaining water from a deeper, nearby well.

Well Maintenance

As groundwater levels decline, wells may not pump as much water because there is less saturated aquifer to draw from and pumps may cycle more frequently. If you depend on a domestic well as your primary water supply, good well maintenance can help you anticipate or prevent a water shortage. To avoid being left "high and dry" in a time of drought, use the following list to check the condition of your well:

1) Know how your well is constructed. It may be possible to lower the pump in your well when water levels are low.

2) Periodically measure the water level in your well. Knowing how the water level changes over time can help you anticipate when or if problems are likely to occur.

3) Make sure that pressure tanks are properly adjusted and that there are no leaks in the supply system. Electrical problems, such as a malfunctioning switch at the pressure tank, may also cause a loss of water. Replace pressure tanks from time to time.

You can keep more water available for use by installing a larger storage system and allowing the water level in the well to recover between pumping cycles. Over time, well-screen openings can become clogged with sediment and mineral deposits. You may be able to increase the production of a well by rehabilitation methods such as brushing and chemical treatment.

Remember to always consult a licensed or certified well driller or pump installer for advice and assistance with well and pump system maintenance.

Pinal Creek Group Operates Numerous Remediation Facilities

Over the past few years the Pinal Creek Group has constructed and commissioned several new remediation facilities designed to capture and treat poor quality groundwater in Pinal Creek's alluvial aquifer. Between 1998 and 2001, a wellfield (A) was constructed at Lower Pinal Creek to capture contaminated groundwater that threatened surface water quality in perennial Pinal Creek. The wellfield has a maximum capacity of 6,500 gallons per minute and is complimented by an underground barrier wall that is situated immediately downgradient from the wellfield. The barrier wall is approximately 1,200 feet long, 100 feet deep, and is 3-5 feet in width. The underground barrier wall is a low-permeability structure comprised of a soil-cement-bentonite-clay mixture, which ensures that contaminants do not migrate past the wellfield.

Water captured by the Lower Pinal Creek Wellfield and barrier wall is pumped to the Lower Pinal Creek Water Treatment Plant (B) located at Hicks Wash on old State Route 88. The plant utilizes a lime treatment process to neutralize influent water, precipitate metals, and clarify the water. The water is then pH adjusted, filtered, and discharged into perennial Pinal Creek. The precipitated metals, or process sludge, are delivered through a closed-circuit system to the Diamond H Pit (C) at the BHP Copper Cities mine for disposal. The plant has a maximum capacity of 6,500 gallons per minute, or about 9.4 million gallons per day. All of the water that is pumped from the Lower Pinal Creek Wellfield is treated at the Lower Pinal Creek Water Treatment Plant and is then released to perennial Pinal Creek.

The Kiser Basin Wellfield (D) is located at the confluence of Bloody Tanks Wash and Russell Gulch, near the intersection of Highways 60 and 188. This wellfield was expanded significantly in 2000 and has a maximum capacity of 4,200 gallons per minute. The wellfield captures poor quality groundwater migrating into Kiser Basin and forms a hydraulic barrier that allows inflows of clean water from Russell Gulch to bypass the system and flow into Pinal Creek via Miami Wash.

Water captured by the Kiser Basin Wellfield is pumped to the Diamond H Pit Neutralization Plant at Copper Cities, where it is neutralized prior to its discharge into the Diamond H Pit. This water is then managed at the Diamond H Pit for use throughout the mining district. The amount of water pumped and consumed by this system does not exceed the amount of water consumed historically by local mining companies in this area.

Due to pit slope degradation that occurred in the spring of 2004, PCG determined, in consultation with the Arizona Department of Environmental Quality, that it was prudent to install an interim plant and disassemble the existing Diamond H Pit Neutralization Plant. The Diamond H Pit Neutralization Plant will be reconfigured, reconstructed and relocated at a new site farther from the pit's edge in 2005. No offsite discharges occurred during the deconstruction project and, due to the drought and low flow conditions in the aquifer, the interim system is able to manage all poor quality water pumped from the Kiser Basin Wellfield.